



EU Type Examination Certificate Number: 0120/SGS0461

EM-Lite Ltd

1 Stevern Way
Peterborough
United Kingdom
PE1 5EL

Instrument Identification:
EMP1.xx
EMP1.cx

Polyphase, Active Import / Export, Electricity Meter
Polyphase, Active Import / Export, Transformer Operated, Electricity Meter

Instrument Traceable Number
0120/SGS0461

has been assessed and certified as meeting the requirements of

EU Directive 2014/32/EU **on Measuring Instruments Annex II, Module B**

It is certified that the manufacturer's technical design and specimen for the above instrument has been examined and, based on the evidence submitted, it is considered that the instrument conforms to the requirements of Annex V of EU Directive 2014/32/EU

This certificate must be used in conjunction with a certificate covering the product verification as required in Annex II, Module D or Annex II, Module F

This certificate is valid until 11th June 2030
Issue 7

Certification is based on report number(s): EMA277432/1/MID, dated 12th June 2020
EMA277432/2/MID, dated 25th March 2021, EMA308873/1 dated 20th October 2022

Authorised Signature

Mikko Välimäki

SGS Fimko OY, Notified Body 0598
Takomotie 8, FI-00380 Helsinki, Finland
t +358 9 6963 61 www.sgs.fi





EU-Type Examination Certificate Number:

0120/SGS0461

Issue Number: 7

Dated: 3rd May 2023

1. Technical Data

Manufacturer	EM-Lite Ltd	
Meter Types	Direct Connected: EMP1.** Transformer Operated: EMP1.c*	
Voltage Rating (U_n)	3*230/400 V	
Current Rating ($I_{min} - I_{ref} (I_{max})$)	EMP1.**: 0.25-5(100)A, 0.5-10(100)A, 1-20(100)A EMP1.c*: 0.05-5(6)A	
Frequency (F_n)	50Hz	
Active Accuracy Class (kWh)	A or B (kWh)	
Type of circuit	3p4w	
Temperature Range	-40°C to +70°C	
Software/ Firmware Version No's	EMP1.**	EMP1.c*
	V1.00.0, V1.01.6, V1.01.7, V1.06.0, V1.06.6, V1.07.4 V1.07.6	V2.00.0, V2.00.7
CRC Checksum No's	A7E9, B4F6, B1EA, 75AA, 4D5C, 230F, DEA7	BC4C, E010
	LCD	
Identification Location	EMP1.**	EMP1.c*
	EMP1.at: EMP1-4006-17 EMP1.av: EMP1-4004-17 EMP1.az: EMP1-4005-17 EMP1.ay: EMP1-4003-17 EMP1.x: EMP1-4002-17 EMP1.w: EMP1-4001-17 EMP1.r : EMP1-4007-17 EMP1.ax:EMP1-4008-17	EMP1.cr: EMP1-4010-17 EMP1.cw: EMP1-4011-17 EMP1.cx: EMP1-4009-17
IP Rating	IP54	
Insulation Protective Class	Class II	
LED Pulse Constant	EMP1.**: 1000 imp/kWh EMP1.c*: 10000 imp/kWh	
Impulse Voltage Rating	6kV	
AC Voltage Rating	4kV	
Main Cover Sealing Type	Press fit non-removable lasered plastic seals	
Terminal Cover Sealing Type	Wire & Crimp	
Integrity of meter	Inaccessible without breaking seals	



EU-Type Examination Certificate Number:

0120/SGS0461

Issue Number: 7

Dated: 3rd May 2023

Intended Location of the Meter	Indoor
Type of Register	LCD
Terminal Arrangement(s)	BS
Location of Manufacturers Address	Nameplate

SGS

EU-Type Examination Certificate Number:

0120/SGS0461

Issue Number: 7

Dated: 3rd May 2023

2. Photograph of Meter and Sealing Plan



Main Cover Sealing Points

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EU-Type Examination Certificate Number:

0120/SGS0461

Issue Number: 7

Dated: 3rd May 2023

3. Examples of Nameplates

Direct Connected

emlite

Display Cycle

1000 Imp / kWh CL.B

1000 Imp / kvarh CL.2

Serial no: **EML2112000005**
Property of: SGS Sample

Model/Type Code: **EMP1.ay**

3 x 230/400V 50Hz
3 x 0.25-4(100)A
-25°C...+55°C
2021
EN 60770-1,3
IEC 62053-23

UK M21 0598 0120 0461

Em-Lite Ltd, PE1 8EL, UK

60 61

emlite

Display Cycle

Connect

1000 Imp / kWh CL.B

1000 Imp / kvarh CL.2

Serial no: **EML2112000005**
Property of: SGS Sample

Model/Type Code: **EMP1.W**

3 x 230/400V 50Hz
3 x 0.25-4(100)A
-25°C...+55°C
2021
EN 60770-1,3
IEC 62053-23

UK M21 0598 0120 0461

Em-Lite Ltd, PE1 8EL, UK

60 61 + 20 21 - 22 23

emlite

Display Cycle

Connect

1000 Imp / kWh CL.B

1000 Imp / kvarh CL.2

Serial no: **EML2112000005**
Property of: SGS Sample

Model/Type Code: **EMP1.f**

3 x 230/400V 50Hz
3 x 0.25-4(100)A
-25°C...+55°C
2021
EN 60770-1,3
IEC 62053-23

UK M21 0598 0120 0461

Em-Lite Ltd, PE1 8EL, UK

60 61 + 20 21 - 22 23

emlite

Display Cycle

Connect

1000 Imp / kWh CL.B

1000 Imp / kvarh CL.2

Serial no: **EML2112000005**
Property of: SGS Sample

Model/Type Code: **EMP1.x**

3 x 230/400V 50Hz
3 x 0.25-4(100)A
-25°C...+55°C
2021
EN 60770-1,3
IEC 62053-23

UK M21 0598 0120 0461

Em-Lite Ltd, PE1 8EL, UK

60 61 + 20 21 - 22 23

Transformer Operated

emlite

Display Cycle

10000 Imp / kWh CL.B

10000 Imp / kvarh CL.2

Serial no: **EML2224123456**
Property of: Sample

Model/Type Code: **EMP1.CX**

3 x 230/400V 50Hz
3 x 0.05-5(5)A
-40°C...+70°C
2022
EN 60770-1,3 IEC 62053-11,21,23
0120/SGS0461

UK M22 0120

CE M22 0598

Em-Lite Ltd, PE1 8EL, UK

60 61 + 20 21 - 22 23

4. Calculation of the composite error/ MPE

During the type approval examination the influence factors for temperature, frequency and voltage are determined per load point. The table below represents the sum of the square values per load, determined via the following formula:-

$$\delta e(T, U, f) = \sqrt{(\delta e^2(T, I, \cos\varphi) + \delta e^2(U, I, \cos\varphi) + \delta e^2(f, I, \cos\varphi))}$$

where

- $\delta e(T, I, \cos\varphi)$ = Additional error due to variation of the temperature at the same load
- $\delta e(U, I, \cos\varphi)$ = Additional error due to variation of the voltage at the same load
- $\delta e(f, I, \cos\varphi)$ = Additional error due to variation of the frequency at the same load



EU-Type Examination Certificate Number:

0120/SGS0461

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Direct Connected

		Influence Factors for Temperature. Frequency & Voltage							
Current	PF Cos	-40°C	-25°C	-10°C	5°C	30°C	40°C	55°C	70°C
I _{min}	1.0	0.49	0.36	0.27	0.16	0.09	0.11	0.13	0.20
I _{tr}	1.0	0.50	0.37	0.25	0.13	0.09	0.11	0.12	0.17
10I _{tr}	1.0	0.58	0.44	0.28	0.20	0.13	0.14	0.13	0.13
I _{max}	1.0	0.71	0.63	0.42	0.22	0.09	0.09	0.09	0.13
I _{tr}	0.5ind	0.51	0.35	0.24	0.11	0.09	0.11	0.18	0.33
10I _{tr}	0.5ind	0.57	0.42	0.33	0.18	0.12	0.17	0.20	0.33
I _{max}	0.5ind	0.67	0.59	0.41	0.16	0.09	0.06	0.11	0.06
I _{tr}	0.8cap	0.55	0.40	0.26	0.14	0.10	0.10	0.11	0.16
10I _{tr}	0.8cap	0.50	0.36	0.23	0.18	0.15	0.15	0.15	0.18
I _{max}	0.8cap	0.71	0.53	0.35	0.20	0.06	0.06	0.09	0.10
L1						0.00	0.00	0.00	0.00
I _{tr}	1.0	0.52	0.42	0.25	0.12	0.10	0.11	0.08	0.14
10I _{tr}	1.0	0.62	0.49	0.29	0.19	0.13	0.14	0.13	0.20
I _{max}	1.0	0.79	0.63	0.38	0.23	0.07	0.07	0.02	0.06
I _{tr}	0.5ind	0.48	0.35	0.23	0.12	0.10	0.13	0.17	0.32
10I _{tr}	0.5ind	0.58	0.46	0.26	0.15	0.09	0.15	0.14	0.25
I _{max}	0.5ind	0.72	0.57	0.34	0.25	0.20	0.21	0.21	0.21
L2									
I _{tr}	1.0	0.49	0.33	0.20	0.10	0.09	0.12	0.14	0.26
10I _{tr}	1.0	0.50	0.30	0.21	0.11	0.10	0.09	0.17	0.18
I _{max}	1.0	0.74	0.57	0.35	0.19	0.10	0.10	0.10	0.10
I _{tr}	0.5ind	0.47	0.30	0.14	0.11	0.13	0.16	0.21	0.45
10I _{tr}	0.5ind	0.49	0.33	0.23	0.17	0.18	0.17	0.19	0.32
I _{max}	0.5ind	0.66	0.58	0.29	0.18	0.11	0.08	0.08	0.08
L3									
I _{tr}	1.0	0.62	0.49	0.28	0.16	0.08	0.09	0.11	0.19
10I _{tr}	1.0	0.64	0.51	0.30	0.15	0.11	0.14	0.11	0.14
I _{max}	1.0	0.80	0.64	0.40	0.25	0.06	0.06	0.06	0.10
I _{tr}	0.5ind	0.60	0.44	0.26	0.14	0.08	0.12	0.17	0.29
10I _{tr}	0.5ind	0.65	0.52	0.30	0.13	0.09	0.09	0.13	0.21
I _{max}	0.5ind	0.89	0.65	0.38	0.35	0.01	0.04	0.09	0.05



EU-Type Examination Certificate Number:

0120/SGS0461

Issue Number: 7

Dated: 3rd May 2023

Transformer Connected

		Influence Factors for Temperature. Frequency & Voltage							
Current	PF Cos	-40°C	-25°C	-10°C	5°C	30°C	40°C	55°C	70°C
I _{min}	1.0	1.01	0.80	0.53	0.25	0.08	0.16	0.09	0.08
I _{tr}	1.0	1.03	0.76	0.49	0.21	0.11	0.21	0.22	0.10
10I _{tr}	1.0	0.87	0.68	0.45	0.22	0.07	0.22	0.13	0.06
I _{max}	1.0	0.95	0.67	0.44	0.22	0.14	0.20	0.19	0.16
I _{tr}	0.5ind	1.21	0.91	0.60	0.29	0.09	0.22	0.23	0.16
10I _{tr}	0.5ind	0.89	0.73	0.50	0.31	0.25	0.28	0.29	0.25
I _{max}	0.5ind	0.79	0.59	0.36	0.21	0.21	0.31	0.26	0.20
I _{tr}	0.8cap	0.99	0.84	0.45	0.20	0.10	0.18	0.17	0.08
10I _{tr}	0.8cap	0.93	0.61	0.39	0.20	0.17	0.22	0.21	0.17
I _{max}	0.8cap	0.95	0.60	0.44	0.21	0.11	0.17	0.17	0.10
L1									
I _{tr}	1.0	0.85	0.77	0.44	0.14	0.13	0.21	0.14	0.13
10I _{tr}	1.0	0.95	0.70	0.46	0.23	0.13	0.22	0.23	0.14
I _{max}	1.0	0.88	0.70	0.31	0.19	0.19	0.31	0.25	0.14
I _{tr}	0.5ind	1.31	1.00	0.67	0.36	0.08	0.17	0.14	0.18
10I _{tr}	0.5ind	0.90	0.65	0.43	0.30	0.21	0.27	0.32	0.21
I _{max}	0.5ind	0.88	0.64	0.34	0.20	0.16	0.28	0.28	0.13
L2									
I _{tr}	1.0	1.15	0.81	0.50	0.18	0.18	0.47	0.49	0.17
10I _{tr}	1.0	0.91	0.72	0.41	0.18	0.08	0.12	0.12	0.08
I _{max}	1.0	0.78	0.56	0.33	0.17	0.05	0.17	0.10	0.05
I _{tr}	0.5ind	1.29	0.99	0.68	0.23	0.15	0.28	0.45	0.20
10I _{tr}	0.5ind	0.94	0.77	0.49	0.36	0.30	0.32	0.29	0.29
I _{max}	0.5ind	0.82	0.69	0.46	0.22	0.08	0.08	0.09	0.08
L3									
I _{tr}	1.0	1.11	0.55	0.23	0.16	0.13	0.15	0.13	0.16
10I _{tr}	1.0	0.92	0.61	0.32	0.12	0.18	0.20	0.27	0.11
I _{max}	1.0	0.89	0.56	0.41	0.14	0.14	0.22	0.28	0.12
I _{tr}	0.5ind	1.30	0.87	0.54	0.24	0.13	0.28	0.16	0.19
10I _{tr}	0.5ind	1.00	0.79	0.44	0.29	0.27	0.28	0.29	0.26
I _{max}	0.5ind	0.96	0.64	0.37	0.08	0.10	0.15	0.23	0.08



EU-Type Examination Certificate Number:

0120/SGS0461

Issue Number: 7


Dated: 3rd May 2023

5. Annex of Variants

Product Variant Identification Details:

Type Designation	Description of meter
EMP1.at	Multi-rate version with ToU functionality, two pulsed outputs and auxiliary relay for control of off-peak circuits. Includes terminal cover and magnetic tamper detect
EMP1.av	Basic Single Rate Polyphase Meter, one pulse output
EMP1.az	Basic Single Rate Polyphase Meter, no outputs
EMP1.ay	Modular Smart meter version without supply control switch, no outputs
EMP1.x	Modular Smart meter version with supply control switch, two pulsed outputs and auxiliary relay for control of off-peak circuits.
EMP1.w	Modular Smart meter version with supply control switch, two pulsed outputs and auxiliary relay for control of off-peak circuits. Includes temperature monitoring and meter case tamper detect.
EMP1.r	Modular Smart meter version with supply control switch, two pulsed outputs and auxiliary relay for control of off-peak circuits. Includes temperature monitoring, meter case and magnetic tamper detect.
EMP1.ax	Modular smart meter version without supply control switch, with two pulsed outputs and auxiliary relay for control of off-peak circuits
EM1P.cx	CT Modular smart meter version without supply control switch, two pulsed outputs and auxiliary relay for control of off-peak circuits.
EMP1.cw	CT Modular smart meter version without supply control switch, two pulsed outputs and auxiliary relay for control of off-peak circuits. Includes temperature monitoring, meter case tamper detect.
EMP1.cr	CT Modular smart meter version without supply control switch, two pulsed outputs and auxiliary relay for control of off-peak circuits. Includes temperature monitoring, meter case and magnetic tamper detect.
MC12	Communication Module for use with all modular versions

Modifications to the meter(s) described according to approval No. **0120/SGS0461** must be notified to the issuing body to confirm the meter(s) continuing compliance to the relevant pattern approval standard(s).

	EU-Type Examination Certificate Number:	
	0120/SGS0461	
	Issue Number: 7	Dated: 3 rd May 2023

6. Document Revision History

Issue	Date	Comments
1	12/06/2020	Initial Issue
2	10/09/2020	Software version V1.01.6 & checksum B4F6 added. BOM updated for all variants.
3	26/04/2021	New models; EMP1.ay, EMP1.x, EMP1.w, EMP1.r and MC12 added. Software versions V1.01.7, V1.06.0 & checksum B1EA, 75AA added. Bom number updated for all models. Change of Notified Body reference
4	19/11/2021	New variant EMP1.ax added to approval. New software version V1.06.6 & updated BoM versions
5	24/10/2022	New model EMP1.cx added to approval.
6	02/03/2023	Additional software version V1.07.4 & checksum 230F
7	03/05/2023	New software versions. EMP1.xx: V1.07.6, CRC DEA7. EMP1.cx: V2.00.7, CRC E010.

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END OF CERTIFICATE